

REMARKS

Claims 1, 14, 24, 26, 32, 36, and 39 have been amended, and claims 19-23, 25, and 33 have been cancelled. Accordingly, claims 1-18 and 24, 26-32, and 34-44 remain pending.

The Examiner has objected to the specification with respect to a number of typographical errors, which have been corrected herein.

The drawings have been objected to as failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include a reference symbol T2 for Fig. 2a as mentioned in the specification. A replacement sheet for Fig. 2a has been provided.

The drawings and specification are object to as failing to comply with 37 C.F.R. 1.84(p)(5) because the reference characters that are not mentioned in the description. Replacement sheets for Figs. 3b, 5a, 7, and 11f, on which the reference symbols, noted by the Examiner, have been removed, are herein provided. However, it is noted that the reference symbol 524 for Fig. 5a appears in the specification on page 42, line 1 and such reference symbol remains on Fig. 5a. It is respectfully submitted that the drawings now comply with 37 C.F.R. 1.84(p)(5).

The Examiner rejected claims 1-44 under 35 U.S.C. §101 as being directed towards non-statutory subject matter. Specifically, the Examiner asserts that the steps (i) in claim 1 of using a scatterometry overlay technique to analyze signals to determine an overlay error, (ii) in claim 14 comparing the measured scatterometry signal (to determine a characteristic), (iii) in claim 19 using a scatterometry overlay technique to determine an overlay error, (iv) in claim 24 using a scatterometry overlay technique to analyze signals to determine an overlay error, (v) in claim 32 using a model based technique to analyze signals to determine an overlay error, and (vi) in claim 39 using a scatterometry overlay technique to analyze signals to determine an overlay error, are abstractions without a tangible result. The pending independent claims have been amended to recite operations of storing an overlay error or a characteristic (that was determined by analysis or comparison operations) to overcome this subject matter rejection. It is respectfully submitted that a determined overlay error value (or other characteristic of the target or process condition) is a tangible result that could be used for any number of practical purposes, such as correction of lithographic process and/or tool. Accordingly, it is submitted that the pending claims comply with 35 U.S.C. §101.

The Examiner has deemed claim 1-13, 25-27, 33, and 34 to be allowable if rewritten to overcome the rejection under 35 U.S.C. §101 and rewritten in independent form (when in dependent form) to include all of the limitations of any rejected base claim and any intervening

claims. Towards this end, the limitations of dependent claim 25 have been inserted into independent, base claim 24. Likewise, the limitations of dependent claim 33 have been inserted into independent, base claim 32. Accordingly, it is submitted that independent claims 1-13, 24, 32 and their dependent claims 26-32, and 34-44 are now allowable.

The Examiner rejected claims 14-17, 19-22, 24, 28-30, 32, and 35-37 under 35 U.S.C. §102(e) as being anticipated by Yang et al. (U.S. Patent 6,982,793). Claims 18, 23, 31, and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yang in view of Niu et al. (U.S. Patent 6,699,624). The rejections of 24, 28-30, 32, and 35-37 are considered moot in light of the amendments with respect to the allowable claims as described above. The rejections of claims 19-23 are moot in view of the cancellation of such claims. However, the Applicant reserves the right to pursue such claims in a continuation. The Examiner's rejections of claims 14-18 are respectfully traversed as follows.

Claim 14 is directed towards a “method of determining an overlay error between two layers of a multiple layer sample.” Claim 14 also requires “for a plurality of theoretical overlay errors and a plurality of target configurations and/or process conditions, generating a plurality of theoretical scatterometry signals on the plurality of target configurations using a model or calibrated data” and “storing the plurality of theoretical scatterometry signals and their associated theoretical overlay errors and target configurations and/or process conditions.” Claim 14 further recites “for each of a plurality of measured periodic targets that each have a first structure formed from a first layer and a second structure formed from a second layer of the sample, measuring an optical signal, wherein there are predefined offsets between the first and second structures” and “determining a measured overlay error between the first and second structures by analyzing the measured optical signals from the periodic targets using a scatterometry overlay technique based on the predefined offsets without using a calibration operation.” Claim 14 further recites “comparing the measured scatterometry signal with the stored theoretical scatterometry signals to obtain and store a characteristic of the measured periodic targets’ configuration or process condition for such measured periodic targets based on a substantially matching theoretical overlay error and measured overlay error.”

Yang mentions the use of model based overlay determination in a few brief passages. In the cited portions (Col. 2, Lines 54-63), Yang appears to teach modeling a difference between the measured signals from two locations and determining overlay based on such modeling. However, Yang fails to teach or suggest storing theoretical signals, along with their associated overlay errors and target configurations and/or process conditions and then performing a comparison between the signals that are measured from targets having offsets and the stored theoretical signals to then determine target configuration characteristics or process conditions

characteristics based on substantial matching of theoretical and measured overlay errors, in the manner claimed. Accordingly, it is respectfully submitted that claim 14 is patentable over Yang.

The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 15-18 each depend directly or indirectly from independent claim 14, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claim 14. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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